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# Cost of Apple Production in Minnesota*

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WHILE the State of Minnesota does not figure largely in the apple production of the country as a whole, its annual production averages around 1,250,000 bushels of which 300,000 bushels may be considered commercial production. The question has arisen frequently if the commercial apple grower in Minnesota is able to make a profit in the enterprise and meet the strong competition from other sections. With this question in mind a study of production costs by the survey method was completed in 1920, covering the years 1916 to 1920. Paralleling the cost study, observations were made in regard to general orchard conditions.

Most of the orchards in Minnesota are found in the neighborhood of Lake Minnetonka, along the Mississippi Valley or in the southern tier of counties. Although the 1920 census shows 13,000 acres of bearing orchard, most of this acreage is in home orchards and not over 2,000 acres can be considered in commercial production. The majority of these orchards were planted from 1900 to 1906.

The standards of management are not high. A few are well managed, but the majority border upon neglect, or show marked defects in treatment. Most of the orchards are badly crowded, the average population being 122 trees per acre. Pruning is not done thoroughly, spraying is rather poorly done due to lack of good equipment, or to too few applications. Most orchards are in old sod and are making poor growth. A gradual improvement is being made in the management of these orchards, but it should be noted here that the averages given are made from data obtained in orchards which have not had proper management. If good management were the rule, there is no doubt that yields and returns would be increased considerably at little extra cost.

On the average, the prices for local apples has equalled or exceeded the prices for those shipped from other sections. The Minnesota grower is favored by an apparent inversion of competition which seems to prevail in regions producing only a small proportion of the apples used in that section. The great bulk of apples consumed in Minnesota comes from the large producing centers such as Washington, Michigan, and Missouri. The sell-

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ing price for these apples is the price at the point of origin plus transportation and handling charges. The local grower having much lower transportation costs finds a favorable price maintained which yields him a wider margin of net profit than his competitors receive. Granting that this survey covering the years 1916 to 1920 includes three years of high prices, it must not be overlooked that little grading is done in Minnesota and that for poorly graded fruit the price will range lower than for a well graded product. The average price for all grades during the period covered by the survey was $1.53 per bushel. Including culls, practically all of which are sold, the price averaged $1.44.

Data were obtained from only 64 orchards but these are representative of the industry. Each orchard was visited and the figures obtained on the basis of normal operations based on a five year average. The earlier records were supplemented by additional data bringing all up to the basis of 1920. All data departing markedly from the normal have been disregarded in striking the weighted averages.

In the orchards surveyed there were 487 acres of bearing trees representing 33.9 per cent of the tillable land of the farms. The average acre valuation was $510.00. The average orchard comprised 7.6 acres the range in size being from 1.2 to 30 acres. The age ranged from 8 to 36 years, but averaged 16 years in 1920.

As pointed out previously the orchards are badly crowded averaging 122 trees per acre. Under such conditions the bearing wood is confined to the upper third of the trees resulting in the low average yield of 1.2 bushels per tree and 150 bushels per acre. In the better managed orchards the yields ranged from 250 to 400 bushels indicating the possibilities under good care.

The leading commercial varieties are Wealthy, Oldenburg, Northwestern Greening, and Patten (Greening). Other varieties such as Hibernal, Salome, Wolf River, Malinda, Anisim, and Charlamoff, are found frequently. McIntosh, Delicious, Grimes, King David and other more tender varieties are occasionally found topworked on hardy stock.

The average gross returns based on the yields and prices already given amounted to $215.99 per acre, ranging from $24.00 in a poor orchard to $506.00 in the best one. In 28 of the better grade of orchards the gross amounted to $307.00 per acre. This last figure clearly indicates the value of better management and shows the possibilities of the Minnesota orchard.

Common maintenance practices are manuring, pruning, brush disposal, spraying and mowing. The labor and cost charges for these items are given in the accompanying table. The figures for spraying are based on two applications per year. At the time of the survey a few were spraying three or four times, but the majority sprayed only twice. During the past two or three years there

has been much improvement in this item in the way of greater efficiency and more applications.

Handling items include picking, hauling from the orchard, sorting and packing, and hauling to market. Not much sorting or grading is done except the removal of culls. The average haul to market is 2.25 miles and the average load 58 bushels.

Total labor charges average 131.7 man hours per acre of which 56.3 hours are credited to the owner. Horse hours average 55.3. Labor has been charged at the average rate for farm labor of 25 cents per man hour and 15 cents per horse hour. Labor costs average $41.24 per acre and 27.7 cents per bushel.

Material costs, including the charges for spray materials, manure, packages and replacement of picking baskets, amount to $42.15 per acre and 28.2 cents per bushel. The package charge is the largest single item of cost as seen in the table, and is an average of the prices of baskets and barrels prevailing during the period covered in the survey. The manure charge is for 3.7 tons per acre at $1.50 per ton. The spray materials used in two applications of 125 gallons per acre were 7.5 pounds of arsenate of lead and 6.25 gallons of lime-sulfur concentrate. The average price of the lead arsenate was 27 cents per pound and the lime-sulfur averaged 25 cents per gallon.

Fixed costs amount to $38.17 per acre and 25.3 cents per bushel. Interest on the investment of $510.00 per acre is charged at 6 per cent. Taxes are charged arbitrarily at .5 per cent of the investment. Spray equipment valuation averaged $18.24 per acre. Interest on this amount is charged at 6 per cent and depreciation at 12.5 per cent. Miscellaneous equipment valuation averaged $10.33 per acre. Interest on this amount is charged at 6 per cent and depreciation at 10 per cent.

The total operating costs amount to $121.56 per acre and 81.2 cents per bushel. Overhead is fixed arbitrarily at 3 per cent of these figures and amount to $3.64 per acre and 2.4 cents per bushel.

Total costs as seen in the table are $125.20 per acre and 83.6 cents per bushel. With gross returns of $215.99 and 144.3 cents per acre and per bushel respectively, the net return amounts to $90.79 per acre and 60.7 cents per bushel. In 28 of the better orchards the gross returns averaged $307.81 per acre leaving a larger net profit although costs were somewhat above the average.

The average total income per acre includes the owners labor value of $14.09, interest charges of $32.31, and the net profit of $90.79 totalling $137.19 per acre. Though based on data from rather poorly handled orchards, these figures indicate that apple orcharding can be made to pay well in Minesota. The industry probably never will become extensively developed, but with good

management and suitable varieties, it certainly can be conducted profitably.

SUMMARY OF ACRE AND BUSHEL COSTS AND PROFITS IN MINNESOTA APPLE ORCHARDS

| | Man Hours per Acre | Horse Hours per Acre | Cost per Acre in Dollars | Cost per Bushel in Cents |
|---|---|---|---|---|
| Manuring | 6.96 | 11.54 | $3.47 | 2.3 |
| Pruning | 17.83 | ..... | 4.46 | 2.9 |
| Disposal of brush | 3.54 | 3.55 | 1.42 | 0.9 |
| Spraying (2 times) | 16.46 | 11.24 | 5.80 | 3.8 |
| Mowing grass | 6.17 | 4.07 | 2.15 | 1.4 |
| Total maintenance costs | 50.96 | 30.4 | 17.30 | 11.3 |
| Picking | 50.31 | ..... | 12.58 | 8.4 |
| Hauling from orchard | 9.02 | 12.41 | 4.12 | 2.7 |
| Sorting and packing | 14.32 | ..... | 3.58 | 2.6 |
| Hauling to market | 7.14 | 12.52 | 3.66 | 2.7 |
| Total handling costs | 80.79 | 24.93 | 23.94 | 16.4 |
| Total labor costs | 131.75 | 55.33 | 41.24 | 27.7 |
| Spray materials | ..... | ..... | 5.61 | 3.7 |
| Manure | ..... | ..... | 3.58 | 2.4 |
| Packages | ..... | ..... | 32.04 | 21.5 |
| Replacement of picking baskets | ..... | ..... | 0.92 | 0.6 |
| Total material costs | ..... | ..... | 42.15 | 28.2 |
| Interest on investment | ..... | ..... | 30.60 | 20.4 |
| Taxes | ..... | ..... | 2.55 | 1.7 |
| Spray equipment—interest | ..... | ..... | 1.09 | 0.7 |
| Spray equipment—depreciation | ..... | ..... | 2.28 | 1.5 |
| Miscellaneous equipment—interest | ..... | ..... | 0.62 | 0.4 |
| Miscellaneous equipment—depreciation | ..... | ..... | 1.03 | 0.6 |
| Total fixed costs | ..... | ..... | 38.17 | 25.3 |
| Total operating costs | ..... | ..... | 121.56 | 81.2 |
| Overhead (3 per cent of operating costs) | ..... | ..... | 3.64 | 2.4 |
| Total costs | ..... | ..... | 125.20 | 83.6 |
| | | | Per Acre | Per Bushel |
| Gross returns | ..... | ..... | 215.99 | 144.3 |
| | | | Per Acre | Per Bushel |
| Net profit | ..... | ..... | 90.79 | 60.7 |